

August 15, 1996

MEMORANDUM

TO: Orville D. Green, Assistant Administrator
Permits and Enforcement

FROM: Brian R. Monson, Chief *Bm*
Operating Permits Bureau

SUBJECT: Issuance of Tier II Operating Permit #001-00029 to
Saint Luke's Regional Medical Center (Boise)

PURPOSE

The purpose of this memorandum is to satisfy the requirements of IDAPA 16.01.01 Sections 400 through 406 (Rules for the Control of Air Pollution in Idaho) for issuing Operating Permits.

PROJECT DESCRIPTION

This project is for an Operating Permit for the Saint Luke's Regional Medical Center located in Boise, Idaho. Emission point sources existing at the facility are as follows: four (4) natural gas and/or No. 2 fuel oil boilers with 29.29 MMBtu/hr capacity each, and six (6) diesel emergency generators with various horsepower capacities. Emissions from the sterilizers and diesel storage tanks are included in the engineering technical analysis memorandum.

SUMMARY OF EVENTS

On January 30, 1995, the Division of Environmental Quality (DEQ) received an application for a Tier II Operating Permit. On March 6, 1996, that application was determined complete.

On June 21, 1996, a proposed Tier II OP was issued for public comment. A public comment period was held from June 28, 1996, until July 29, 1996, on the air quality aspects of the proposed permit. No comments were received.

RECOMMENDATIONS

Based on the review of the Operating Permit application and on applicable state and federal regulations concerning the permitting of air pollution sources, the Bureau staff recommends that Saint Luke's Regional Medical Center, Boise, be issued a Tier II Operating Permit. Staff also recommends that the facility be notified in writing of the obligation to pay permit application fees for Tier II permits.

ODG\BRM\HAE:jrj...\permit\stlukes\stlukesf.IMM

cc: J. Palmer, SWIRO
OP File Manual
Source File
COF

June 21, 1996

MEMORANDUM

TO: Brian R. Monson, Chief
Operating Permits Bureau
Permits and Enforcement

FROM: Harbi Elshafei, Air Quality Engineer *Harbi*
Operating Permits Bureau
Jose Fabile, Air Quality Engineer *JF*
Construction Permits Bureau

THROUGH: Susan J. Richards, Air Quality Permits Manager *SJR*
Operating Permits Bureau

SUBJECT: Technical Analysis for Proposed Tier II Operating Permit #001-00029
Saint Luke's Regional Medical Center, Boise, Idaho

PURPOSE

The purpose for this memorandum is to satisfy the requirements of IDAPA 16.01.01 Sections 400 through 406 (Rules for the Control of Air Pollution in Idaho) for issuing Operating Permits.

FACILITY DESCRIPTION

Saint Luke's Regional Medical Center (SLRMC) is located at 190 East Bannock in Boise, Idaho. SLRMC facility consists of four (4) boilers, six (6) diesel emergency generators, three (3) sterilizers, two (2) disposers, three (3) aerators, and five (5) diesel storage tanks.

PROJECT DESCRIPTION

This project is for an Operating Permit (OP) for the following existing point and fugitive emission sources.

Point Sources:

- (1) Boiler #1 - Cleaver Brooks (Model: CB 200-700; Serial No.: L-61585) gas-fired with a maximum rated capacity of 700 boiler horsepower (BHP) or 29.29 MMBtu/hr. The backup fuel is No. 2 fuel oil. This source was constructed in 1976. This source is not subject to NSPS rules of 40 CFR 60, Subpart Dc because it was constructed prior to the promulgation date of that Subpart, which is June 9, 1989. The Boiler is located at the facility's Central Services Building.

Stack Design Specifications

Height:	31.1 feet (minimum)
Exit Diameter:	3.5 feet
Exit Gas Flow Rate:	11,234 acfm (at rated capacity)
Exit Temperature:	365°F

- (2) Boiler #2 - Cleaver Brooks (Model: CB 200-700; Serial No.: L-61406) gas-fired with a maximum rated capacity of 700 BHP or 29.29 MMBtu/hr. The backup fuel is No. 2 fuel oil. This source was constructed in 1976. This source is not subject to NSPS rules of 40 CFR 60, Subpart Dc because it was constructed prior to the promulgation date of that Subpart, which is June 9, 1989. The Boiler is located at the facility's Central Services Building.

Stack Design Specifications

Height:	31.1 feet (minimum)
Exit Diameter:	3.5 feet
Exit Gas Flow Rate:	11,234 acfm (at rated capacity)
Exit Temperature:	365°F

- (3) Boiler #3 - Cleaver Brooks (Model: CB 200-700; Serial No.: L-89707) gas-fired with a maximum rated capacity of 700 BHP or 29.29 MMBtu/hr. The backup fuel is No. 2 fuel oil. DEQ issued a Permit to Construct (PTC) to this source on December 6, 1992. The boiler currently fires natural gas, but use a diesel backup system for a maximum of eight hours per month and 120 hours per year. The source is subject to NSPS rules of 40 CFR 60, Subpart Dc. PTC modifications were issued to this source on July 28, 1993, and on June 20, 1994. One of the modifications included the change to allow SLRMC for annual reporting instead of the quarterly reporting (as required by 40 CFR 60.48c.(d)) for the sulfur content in the No. 2 fuel oil. SLRMC requested the change to annual reporting because they receive a shipment of No. 2 fuel oil from the supplier approximately once per year. On October 7, 1993, EPA Region 10 approved SLRMC to report annually. The boiler is located at the facility's Central Services Building.

Stack Design Specifications

Height:	29.1 feet (minimum)
Exit Diameter:	2.0 feet
Exit Gas Flow Rate:	11,234 acfm (at rated capacity)
Exit Temperature:	365°F

- (4) Boiler #4 - Cleaver Brooks (Model: CB 200-700; Serial No.: L-89708) gas-fired with a maximum rated capacity of 700 BHP or 29.29 MMBtu/hr. The backup fuel is No. 2 fuel oil. DEQ issued a PTC to this source on December 6, 1992. The boiler currently fires natural gas, but use a diesel backup for a maximum of eight hours per month and 120 hours per year. The source is subject to NSPS rules of 40 CFR 60, Subpart DC. PTC modifications were issued to this source on July 28, 1993, and on June 20, 1994. One of the modifications included the change to allow SLRMC for annual reporting instead of the quarterly reporting (as required by 40 CFR 60.48c.(d)) for the sulfur content in the No. 2 fuel oil. On October 7, 1993, EPA Region 10 approved SLRMC to report annually. The Boiler is located at the facility's Central Services Building.

Stack Design Specifications

Height:	29.1 feet (minimum)
Exit Diameter:	2.0 feet
Exit Gas Flow Rate:	11,234 acfm (at rated capacity)
Exit Temperature:	365°F

- (5) Diesel Emergency Generator #1 - Caterpillar (Model: D399; Serial No: 35B1379). The generator's rated capacity is 900 kilowatts (KW). This source was constructed in 1976. The source is located at the facility's Central Services Building.

Stack Design Specifications

Height:	36.6 feet (minimum)
Exit Diameter:	1.08 feet
Exit Gas Flow Rate:	7937 acfm
Exit Temperature:	818°F

- (6) Diesel Emergency Generator #2 - Caterpillar (Model: 3512; Serial No: 24Z1313). The generator's rated capacity is 1050 KW. This source was constructed in 1986. The source is located at the facility's Central Services Building.

Stack Design Specifications

Height:	36.6 feet (minimum)
Exit Diameter:	1.08 feet
Exit Gas Flow Rate:	9965 acfm
Exit Temperature:	1004°F

- (7) Diesel Emergency Generator #3 - Caterpillar (Model: 3516; Serial No: 4XF00419). The generator's rated capacity is 2000 KW. This source was constructed in 1993. On June 22, 1993, a technical memorandum was written by Carole Thomas, DEQ's Air Quality Engineer, in which it was recommended that to issue a below regulatory concern letter to the source. The source is located at the facility's Central Services Building.

Stack Design Specifications

Height:	36.6 feet (minimum)
Exit Diameter:	1.25 feet
Exit Gas Flow Rate:	16833 acfm
Exit Temperature:	1035°F

- (8) Diesel Emergency Generator #4 - Caterpillar (Model: 3406B; Serial No.: 4RG01205). The generator's rated capacity is 350 KW. This source was constructed in 1983. The source is located at the facility's Central Services Building.

Stack Design Specifications

Height:	36.6 feet (minimum)
Exit Diameter:	0.75 feet
Exit Gas Flow Rate:	2670 acfm
Exit Temperature:	1024°F

- (9) Diesel Emergency Generator #5 - Caterpillar (Model: 3304; Serial No.: 83Z02429). The generator's rated capacity is 65 KW. This source was constructed in 1986. The source is located at the hospital's main building.

Stack Design Specifications

Height:	58.4 feet (minimum)
Exit Diameter:	0.66 feet
Exit Gas Flow Rate:	1412 acfm
Exit Temperature:	382°F

- (10) Diesel Emergency Generator #6 - Caterpillar (Model: 3304; Serial No.: 4B10118). The generator's rated capacity is 105 KW. This source was constructed in 1976. The source is located at the hospital's main building.

Stack Design Specifications

Height:	58.4 feet
Exit Diameter:	0.66 feet
Exit Gas Flow Rate:	1412 acfm
Exit Temperature:	382°F

- (11) #4 Sterilizer - AMSCO (Model: Eagle 3000 III ETO; Serial No.: 0136290-13). The sterilizer uses a product called Penn-Gas, which contains twelve percent (12%) ethylene oxide. On December 15, 1994, the sterilizer was converted to use Penn-Gas II, which contains ethylene oxide of ten percent (10%). The sterilizer vents to Disposer #1. Approximately ninety-five percent (95%) of the ethylene oxide used in the sterilizer is vented to Disposer #1, and the five percent (5%) is being removed by the aerators and then it is transferred to Disposer #1.

This source was constructed in December 15, 1994, and it is located at the Hospital Main Building.

Stack Design Specifications

Height:	6.7 feet (minimum)
Exit Diameter:	40x12 inches
Exit Gas Flow Rate:	3651 acfm
Exit Temperature:	116.1°F

- (12) #5 Sterilizer - AMSCO (Model: Eagle 2000 ETO; Serial No.: 0124181-011). Operations, date of construction, location, and stack specifications of this sterilizer are similar to those described for the #4 Sterilizer.
- (13) #6 Sterilizer - AMSCO (Model: 3000 ETO; Serial No.: 0133892-05). This sterilizer vents to Disposer #2. Operations, date of construction, location, and stack specifications of this sterilizer are similar to those described for the #4 Sterilizer.

- (14) Aerator "B" - AMSCO (Chamber Size: 24x28x38 inches; Serial No.: 3028). The Aerator is used to clean the sterilized material of residual ethylene oxide gas after it leaves the sterilizers. The Aerator uses five percent (5%) of the total ethylene oxide that used in the Sterilizers. The stack specifications of the Aerator are similar to those described for the Sterilizers.
- (15) Aerator "C" - AMSCO (Chamber Size: 24x28x38 inches; Serial No.: 3048). Operations and stack specifications of this Aerator are similar of those described for the Aerator "B".
- (16) Aerator "D" - AMSCO (Chamber Size: 24x28x38 inches; Serial No.: 3058). Operations and stack specifications of this Aerator are similar of those described for the Aerator "B".
- (17) Disposer #1 and Disposer #2 - AMSCO (Model: 100 CFM Abator). There are two disposers, one serving two sterilizers and one aerator, and the other serving one sterilizer and aerator. The ethylene oxide gas from both the sterilizers and the aerators is circulated through the disposers. The ethylene oxide disposer system, as described by the manufacturer, converts ethylene oxide gas into carbon dioxide and water vapor by means of catalytic combustion. The manufacturer states that a 99.9% efficiency in ethylene oxide conversion.

Stack specifications of the Disposers are similar of those described for the Sterilizers.

- (18) Storage Tanks. There are five (5) underground storage tanks at the facility. The tanks contains No. 2 fuel oil, which is used to fuel the facility's boilers and emergency generators. Capacities of the storage tanks are as follows:

- Storage Tank #1 -- 1,000 gallons
- Storage Tank #2 -- 2,000 gallons
- Storage Tank #3 -- 12,000 gallons
- Storage Tank #4 -- 4,000 gallons
- Storage Tank #5 -- 25,000 gallons

Fugitive Sources

- (19) Paved and unpaved road emissions.

A more detailed process description is found in the operating permit application materials.

SUMMARY OF EVENTS

On January 30, 1995, DEQ received SLRMC's application for a Tier II Operating Permit, prepared by Spidell and Associates. On February 27, 1995, the application was determined incomplete. On May 1, 1995, SLRMC requested that DEQ change the OP application from Tier II status to a Tier I status. On September 15, 1995, a meeting was held between SLRMC staff, DEQ staff, and SLRMC new consultant (CH²M Hill Company, Portland, OR). In the meeting, DEQ discussed with SLRMC's representatives all of the OP application submittals, which included the St. Luke's desire to withdraw the Tier I OP application and revert it to a Tier II application. On October 4, 1995, DEQ received a letter from SLRMC in which St. Luke's requested that the facility's OP application be removed from Tier I permitting list. On December 11, 1995, DEQ received SLRMC's response to DEQ's June 1, 1995, incompleteness letter, which was prepared by Spidell & Associates. After review, DEQ determined on January 10, 1996, that the submitted information was still incomplete. On February 8, 1996, DEQ received additional information related to the sterilizers and the aerators that are operating at the facility.

After reviewing all applicable federal and state rules and regulations, the application was determined complete on March 6, 1996. Additional information was received by DEQ on April 13, 1996, April 18, 1996, and April 23, 1996.

A public comment period has been scheduled for the proposed permit.

DISCUSSION

1. Emission Estimates

Emission estimates were provided by SLRMC and can be seen in the January 30, 1995, application and in the May 1, 1995, information submittal. DEQ also estimated the PM, PM-10, SO₂, NO_x, CO, and the VOC emissions by using emission factors from AP-42. Sections 1.4 (Natural Gas Combustion) and 1.3 (Fuel Oil Combustion) of AP-42 were used to estimate emissions from the boilers. AP-42, Sections 3.3 (Gasoline and Diesel Industrial Engines) and 3.4 (Large Stationary Diesel and all Stationary Dual Fuel Engines) were used to estimate emissions from the emergency generators. The calculation spreadsheets are in Appendix A.

SLRMC has four (4) boilers (Boiler #1 through Boiler #4) and six (6) emergency generators (Generator #1 through Generator #6) operating at the facility. Boiler #1 and Boiler #2 are fired with natural gas as primary fuel and No. 2 diesel oil as secondary fuel. Boiler #1 and Boiler #2 were not previously permitted by a PTC or OP. Oxides of nitrogen (NO_x) is the pollutant emitted in the greatest amount from the fuel burning equipment (i.e., boilers and generators). Potential to emit (PTE) for NO_x resulting from burning natural gas and No. 2 fuel oil in Boiler #1 and Boiler #2, as estimated by DEQ and based on 8,760 hours of operation per year, is estimated to be 73.4 tons per year (T/yr). Boiler #3 and Boiler #4 are fired with natural gas as primary fuel and No. 2 diesel fuel as secondary fuel. These two (2) Boilers (#3 & #4) were issued a PTC for operation on No. 2 fuel oil. Operations on diesel fuel are limited to a maximum of eight (8) hours per month for testing purposes. The boilers are also limited for operating for a maximum of eight (8) hours per day and for a maximum 120 hours per year per boiler on No. 2 fuel, as indicated in the PTC #001-00029 that issued to the facility on June 20, 1994. There are no operational limits found in the PTC on natural gas fuel operations. Thus, PTE for Boilers #3 & #4 will be based on 8,640 hours of operations with natural gas and 120 hours on No. 2 fuel oil, each. PTE for NO_x for Boiler #3 and Boiler #4 is estimated to be 35.92 T/yr.

Potential to emit for NO_x from the six emergency generators is estimated to be 51.8 T/yr, based on operating hours of 500 hours of operation per generator per year.

Therefore, the total NO_x PTE for the boilers and emergency generators is estimated to be 161.1 T/yr, which is greater than 100 T/yr, the major source threshold. SLRMC's submitted a natural gas fuel consumption for the year 1995 for approximately 111 million cubic feet (MMcf). To allow for the facility an operational flexibility, DEQ added a twenty percent (20%) to the total natural gas consumptions that were used for the year 1995. This would allow the facility to burn natural gas in the boilers in amount equal to 133 million cubic feet (MMcf). An emissions "cap" for the boilers is established based on the natural gas consumption of 133 MMcf per year. Also, an emissions cap on hours of operation on No. 2 fuel oil of 120 hours per boiler per year is established. A short-term emission limits (in lb/hr) for the criteria air pollutants (i.e., PM, PM-10, and NO_x) emitted from each boiler were established and that can be seen in Appendix A of this memo and Appendix A of the OP. An aggregate long term emission limits (in tons/yr) for NO_x emitted from burning natural gas in all the boilers were also established as seen in Appendix A of the OP. No emission limits were established in the OP for CO and VOCs, because the PTE for these pollutants from the boilers when operating continuously on natural gas at full capacity are below 100 T/year. Also, modeling of the CO emissions showed no violations of NAAQS. For more information regarding the modeling results, the reader is referred to Appendix B of this memo.

The allowable NO_x emissions resulting from the natural gas combustion in the boilers and based on the permitted natural gas consumption of 133 MMcf per year is estimated to be 9.29 T/yr. The allowable NO_x emissions resulting from burning No. 2 fuel oil in the boilers, based on operations of 120 hours per boiler per year, is estimated to be 1.03 T/yr. The allowable NO_x emissions resulting from burning No. 2 fuel oil in the generators, based on operations of 60 hours per generator per year, is 6.22 T/yr. Therefore, the allowable NO_x emissions resulting from combustion of No. 2 fuel oil in the boilers and the emergency generators is estimated to be 16.54 T/yr.

Compliance determination for the natural gas fuel usage can be verified by tracking the annual natural gas usage on a twelve months basis. Compliance determination for the No. 2 fuel oil usage can be verified by tracking the hours of operations that the boilers and the generators operate on No. 2 oil on an annual basis. The amount of natural used and the hours of operations data shall be kept on site at all times and shall be made available to Department representatives upon request.

All PM emissions from all emission units at the facility are assumed to be PM-10.

The facility has a three (3) sterilizers, two (2) disposers, and three (3) aerators which use Penn-Gas and Penn-Gas II. The Pen-Gas II contains ten percent (10%) ethylene oxide and ninety percent (90%) of hydrochlorofluorocarbons, as indicated by the MSDS. Penn-Gas contains twelve (12%) ethylene oxide. Emissions of ethylene oxides, a regulated hazardous air pollutant (HAP) from the sterilizers, disposers, and the aerators were estimated by the applicant. Emission calculations were based on the usage of thirty (30) bottles which contain 140 pounds Penn-Gas each and one (1) bottle which contains 140 pounds Penn-Gas II. By assuming a 99.95% destruction efficiency (as estimated by a source test) of ethylene oxide by the disposers, a 0.26 lb/yr of ethylene oxide was vented to the atmosphere during the year 1994. This amount of ethylene oxide emissions is well below the ten (10) T/yr, the Tier I major source threshold of any HAP. Ethylene oxide emissions are not included in the final operating permit.

Volatile organic compounds (VOC) emissions from the storage tanks are estimated by the applicant by using the EPA's Tanks Version 2.0 computer program and that can be seen in the application. The VOC emissions are estimated to be 0.29 lb/yr. DEQ also estimated the VOC emissions from the biggest storage tank at the facility (25,000 gallons capacity) and found that the VOC emissions from that tank match with that estimated by the applicant. VOC emissions from the 25,000 gallons tank is included in Appendix A. These emissions are not included in the final operating permit.

Fugitive dust emissions from paved roads and from parking areas at the facility were not estimated. It was assumed that fugitive dust emissions will be minimum because all the roads at the facility are paved. Fugitive dust emissions shall be controlled in accordance with IDAPA 16.01.01.650 of the Rules.

2. Modeling

DEQ conducted the EPA ISC3 dispersion model for pollutant emissions from ten (10) emission points (the boilers and generators) at the facility. Modeling was performed only on PM-10, CO, and NO_x. Fugitive emissions from the facility were not modeled.

Modeling was performed at worst case operating conditions for the boilers and the generators. These conditions include operations of each boiler continuously for three (3) consecutive months on No. 2 fuel oil and the emergency generators operating for twenty (20) hours per day per generator for a maximum of 60 hours of operations per generator per year. The modeling results predicted a twenty-four (24) hour maximum concentration for PM-10 of 139.1 µg/m³ and an annual maximum concentration of 49.0 µg/m³. The predicted maximum annual NO_x emissions were 80.6 µg/m³. The predicted one-hour maximum concentration for CO was 1922.9 µg/m³; and the predicted eight-hour concentration for CO was 797.5 µg/m³. The modeling results are shown in Appendix B.

The predicted PM-10, CO, and NO_x impacts were determined to be below the National Ambient Air Quality Standards (NAAQS).

A technical memorandum by Mary Walsh, DEQ Meteorologist, regarding the modeling of PM-10, CO, and NO_x emissions from the facility is included in Appendix B.

3. Area Classification

St. Luke's Regional Medical Center is located in Boise, Idaho, which is in AQCR 64 and is designated as nonattainment for particulate matter less than or equal to ten microns (PM-10) and carbon monoxide. For other criteria air pollutants (i.e., SO₂, NO_x, lead, and O₃), the area is classified as attainment or unclassified as defined in 40 CFR 81.313.

4. Facility Classification

The facility is not a designated facility as defined in IDAPA 16.01.01.25. The facility is classified as an A2 source because the actual emissions of NO_x is less than 100 tons per year.

5. Regulatory Review

This operating permit is subject to the following permitting requirements:

- | | |
|------------------------------------|---|
| a. <u>IDAPA 16.01.01.401</u> | Tier II Operating Permit. |
| b. <u>IDAPA 16.01.01.403</u> | Permit Requirements for Tier II Sources. |
| c. <u>IDAPA 16.01.01.404.01(c)</u> | Opportunity for Public Comment. |
| d. <u>IDAPA 16.01.01.404.04</u> | Authority to Revise Operating Permits. |
| e. <u>IDAPA 16.01.01.406</u> | Obligation to Comply. |
| f. <u>IDAPA 16.01.01.470</u> | Permit Application Fees for Tier II Permits. |
| g. <u>IDAPA 16.01.01.625</u> | Visible Emission Limitation. |
| h. <u>IDAPA 16.01.01.650</u> | General Rules for the Control of Fugitive Dust. |
| i. <u>IDAPA 16.01.01.675</u> | Fuel Burning Equipment -- Particulate Matter. |
| j. <u>IDAPA 16.01.01.728</u> | Distillate Fuel Oil. |
| k. <u>40 CFR 60 Subpart Dc</u> | Standard of Performance for Small Industrial- Commercial- Institutional Steam Generating Units. |

FEES

Fees apply to this facility in accordance with IDAPA 16.01.01.470. The facility is subject to permit application fees for Tier II permits of five hundred dollars (\$500.00).

RECOMMENDATIONS

Based on the review of the Operating Permit application and on applicable state and federal regulations concerning the permitting of air pollution sources, the Bureau staff recommends that Saint Luke's Regional Medical Center in Boise be issued a Tier II Operating Permit for the sources that exist at the facility. An opportunity for public comment shall be provided as required by IDAPA 16.01.01.404.01. Staff also recommends that the facility be notified of the Tier II permit fee requirement in writing. This fee will be applicable upon issuance of the permit.

BNM\SJR\HAK:jrj...\permit\stlukes\stlukes.TAM

cc: J. Palmer, SWIRO
Source File
COF

APPENDIX A

ST LUKES REGIONAL MEDICAL CENTER

EMISSION ESTIMATES - FUEL BURNING EQUIPMENT

I. BOILERS ON NATURAL GAS FUEL

EQUIPMENT	BOILER #1	BOILER #2	BOILER #3	BOILER #4	TOTAL
MODEL	CB 200-700	CB 200-700	CB 200-700	CB 200-700	
CAPACITY					
MMBtu/HR	2.93E+01	2.93E+01	2.93E+01	2.93E+01	1.17E+02
FUEL - NATURAL GAS					
FUEL (MMCF/HR)	2.93E-02	2.93E-02	2.93E-02	2.93E-02	1.17E-01
FUEL (MMCF/YR)					1.33E+02
PM/PM-10					
E.F.(LB/MMCF)	1.37E+01	1.37E+01	1.37E+01	1.37E+01	1.37E+01
EM (LB/HR)	4.01E-01	4.01E-01	4.01E-01	4.01E-01	1.61E+00
EM (TPY)	BASED ON PERMITTED NAT. GAS CONSUMPTION/YR				9.09E-01
PTE (TPY)					
8760 HRS	1.76E+00	1.76E+00	1.76E+00	1.76E+00	7.03E+00
8640 HRS			1.73E+00	1.73E+00	3.47E+00
CO					
E.F.(LB/MMCF)	3.50E+01	3.50E+01	3.50E+01	3.50E+01	3.50E+01
EM (LB/HR)	1.03E+00	1.03E+00	1.03E+00	1.03E+00	4.10E+00
EM (TPY)	BASED ON PERMITTED NAT. GAS CONSUMPTION/YR				2.32E+00
PTE (TPY)					
8760 HRS	4.49E+00	4.49E+00	4.49E+00	4.49E+00	1.80E+01
8640 HRS			4.43E+00	4.43E+00	8.86E+00
SO_x					
E.F.(LB/MMCF)	6.00E-01	6.00E-01	6.00E-01	6.00E-01	6.00E-01
EM (LB/HR)	1.76E-02	1.76E-02	1.76E-02	1.76E-02	7.03E-02
EM (TPY)	BASED ON PERMITTED NAT. GAS CONSUMPTION/YR				3.98E-02
PTE (TPY)					
8760 HRS	7.70E-02	7.70E-02	7.70E-02	7.70E-02	3.08E-01
8640 HRS			7.59E-02	7.59E-02	1.52E-01
NO_x					
E.F.(LB/MMCF)	1.40E+02	1.40E+02	1.40E+02	1.40E+02	1.40E+02
EM (LB/HR)	4.10E+00	4.10E+00	4.10E+00	4.10E+00	1.64E+01
EM (TPY)	BASED ON PERMITTED NAT. GAS CONSUMPTION/YR				9.29E+00
PTE (TPY)					
8760 HRS	1.80E+01	1.80E+01	1.80E+01	1.80E+01	7.19E+01
8640 HRS			1.77E+01	1.77E+01	3.54E+01
TOC					
E.F.(LB/MMCF)	5.80E+00	5.80E+00	5.80E+00	5.80E+00	5.80E+00
EM (LB/HR)	1.70E-01	1.70E-01	1.70E-01	1.70E-01	6.80E-01
EM (TPY)	BASED ON PERMITTED NAT. GAS CONSUMPTION/YR				3.85E-01
PTE (TPY)					
8760 HRS	7.44E-01	7.44E-01	7.44E-01	7.44E-01	2.98E+00
8640 HRS			7.34E-01	7.34E-01	1.47E+00

Heating Value of Natural Gas - 1000 BTU/SCF

ST LUKES REGIONAL MEDICAL CENTER

EMISSION ESTIMATES - FUEL BURNING EQUIPMENT

II. BOILERS ON NO. 2 DIESEL FUEL

EQUIPMENT	BOILER #1	BOILER #2	BOILER #3	BOILER #4	TOTAL
MODEL	CB 200-700	CB 200-700	CB 200-700	CB 200-700	
CAPACITY					
MMBtu/HR	2.93E+01	2.93E+01	2.93E+01	2.93E+01	1.17E+02
FUEL - NO. 2 DIESEL FUEL					
FUEL (GAL/HR)	2.14E+02	2.14E+02	2.14E+02	2.14E+02	8.55E+02
FUEL (GAL/YR)					1.03E+05
PM/PM-10					
E.F.(LB/MGAL)	2.00E+00	2.00E+00	2.00E+00	2.00E+00	2.00E+00
EM (LB/HR)	4.28E-01	4.28E-01	4.28E-01	4.28E-01	1.71E+00
EM (TPY)	2.57E-02	2.57E-02	2.57E-02	2.57E-02	1.03E-01
PTE (TPY)					
8760 HRS	1.87E+00	1.87E+00			3.75E+00
120 HRS			2.57E-02	2.57E-02	5.13E-02
CO					
E.F.(LB/MGAL)	5.00E+00	5.00E+00	5.00E+00	5.00E+00	5.00E+00
EM (LB/HR)	1.07E+00	1.07E+00	1.07E+00	1.07E+00	4.28E+00
EM (TPY)	6.42E-02	6.42E-02	6.42E-02	6.42E-02	2.57E-01
PTE (TPY)					
8760 HRS	4.68E+00	4.68E+00			9.37E+00
120 HRS			6.42E-02	6.42E-02	1.28E-01
SOx					
E.F.(LB/MGAL)	7.10E+01	7.10E+01	7.10E+01	7.10E+01	7.10E+01
EM (LB/HR)	1.52E+01	1.52E+01	1.52E+01	1.52E+01	6.07E+01
EM (TPY)	9.11E-01	9.11E-01	9.11E-01	9.11E-01	3.64E+00
PTE (TPY)					
8760 HRS	6.65E+01	6.65E+01			1.33E+02
120 HRS			9.11E-01	9.11E-01	1.82E+00
NOx					
E.F.(LB/MGAL)	2.00E+01	2.00E+01	2.00E+01	2.00E+01	2.00E+01
EM (LB/HR)	4.28E+00	4.28E+00	4.28E+00	4.28E+00	1.71E+01
EM (TPY)	2.57E-01	2.57E-01	2.57E-01	2.57E-01	1.03E+00
PTE (TPY)					
8760 HRS	1.87E+01	1.87E+01			3.75E+01
120 HRS			2.57E-01	2.57E-01	5.13E-01
TOC					
E.F.(LB/MGAL)	5.56E-01	5.56E-01	5.56E-01	5.56E-01	5.56E-01
EM (LB/HR)	1.19E-01	1.19E-01	1.19E-01	1.19E-01	4.76E-01
EM (TPY)	7.13E-03	7.13E-03	7.13E-03	7.13E-03	2.85E-02
PTE (TPY)					
8760 HRS	5.21E-01	5.21E-01			1.04E+00
120 HRS			7.13E-03	7.13E-03	1.43E-02

MGAL - 1000 Gallons

Heating Value of No. 2 Diesel - 137,014 Btu/Gal

ST LUKES REGIONAL MEDICAL CENTER

EMISSION ESTIMATES - FUEL BURNING EQUIPMENT

III. EMERGENCY DIESEL ENGINE GENERATORS

EQUIPMENT	GEN 1	GEN2	GEN 3	GEN 4	GEN 5	GEN 6	TOTAL
MODEL	CAT-D399	CAT-3512	CAT-3516	CAT-3406B	CAT-3304	CAT-3304	
CAPACITY KILOWATTS	9.00E+02	1.05E+03	2.00E+03	3.50E+02	6.50E+01	1.05E+02	4.47E+03
FUEL - NO. 2 DIESEL FUEL							
FUEL (GAL/HR)	7.40E+01	7.80E+01	1.49E+02	2.80E+01	5.80E+00	8.40E+00	3.43E+02
FUEL-MMBtu/HR	1.01E+01	1.07E+01	2.04E+01	3.84E+00	7.95E-01	1.15E+00	4.70E+01
PM/PM-10							
E.F. (LB/MMBtu)	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01	3.10E-01
EM (LB/HR)	3.14E+00	3.31E+00	6.33E+00	1.19E+00	2.46E-01	3.57E-01	1.46E+01
EM (TPY)	9.43E-02	9.94E-02	1.90E-01	3.57E-02	7.39E-03	1.07E-02	4.37E-01
PTE (TPY)							
500 HRS	7.86E-01	8.28E-01	1.58E+00	2.97E-01	6.16E-02	8.92E-02	3.64E+00
CO							
E.F. (LB/MMBtu)	9.50E-01	9.50E-01	9.50E-01	9.50E-01	9.50E-01	9.50E-01	9.50E-01
EM (LB/HR)	9.63E+00	1.02E+01	1.94E+01	3.64E+00	7.55E-01	1.09E+00	4.47E+01
EM (TPY)	2.89E-01	3.05E-01	5.82E-01	1.09E-01	2.26E-02	3.28E-02	1.34E+00
PTE (TPY)							
500 HRS	2.41E+00	2.54E+00	4.85E+00	9.11E-01	1.89E-01	2.73E-01	1.12E+01
SOx							
E.F. (LB/MMBtu)	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01	2.90E-01
EM (LB/HR)	2.94E+00	3.10E+00	5.92E+00	1.11E+00	2.30E-01	3.34E-01	1.36E+01
EM (TPY)	8.82E-02	9.30E-02	1.78E-01	3.34E-02	6.91E-03	1.00E-02	4.09E-01
PTE (TPY)							
500 HRS	7.35E-01	7.75E-01	1.48E+00	2.78E-01	5.76E-02	8.34E-02	3.41E+00
NOx							
E.F. (LB/MMBtu)	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00	4.41E+00
EM (LB/HR)	4.47E+01	4.71E+01	9.00E+01	1.69E+01	3.50E+00	5.08E+00	2.07E+02
EM (TPY)	1.34E+00	1.41E+00	2.70E+00	5.08E-01	1.05E-01	1.52E-01	6.22E+00
PTE (TPY)							
500 HRS	1.12E+01	1.18E+01	2.25E+01	4.23E+00	8.76E-01	1.27E+00	5.18E+01
TOC							
E.F. (LB/MMBtu)	3.50E-01	3.50E-01	3.50E-01	3.50E-01	3.50E-01	3.50E-01	3.50E-01
EM (LB/HR)	3.55E+00	3.74E+00	7.15E+00	1.34E+00	2.78E-01	4.03E-01	1.65E+01
EM (TPY)	1.06E-01	1.12E-01	2.14E-01	4.03E-02	8.34E-03	1.21E-02	4.94E-01
PTE (TPY)							
500 HRS	8.87E-01	9.35E-01	1.79E+00	3.36E-01	6.95E-02	1.01E-01	4.11E+00

Heating Value of No. 2 Diesel - 137,014 Btu/Gal

**Storage Tanks
Emission Estimation**

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT

04/08/96

PAGE 1

TANK IDENTIFICATION AND PHYSICAL CHARACTERISTICS

Identification

Identification No.: Diesel #5
City: Boise
State: ID
Company: St. Luke's Hospital
Type of Tank: Horizontal Fixed Roof

Tank Dimensions

Shell Length (ft): 48
Diameter (ft): 10
Volume(gallons): 25000
Is tank underground? (Y/N): Y
Turnovers: 0
Net Throughput (gal/yr): 5000

Paint Characteristics

Shell Color/Shade: White/White
Shell Condition: Good

Breather Vent Settings

Vacuum Setting (psig): -0.03
Pressure Setting (psig): 0.03

Meteorological Data Used in Emission Calculations: Boise, Idaho

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
LIQUID CONTENTS OF STORAGE TANK

04/08/96
 PAGE 2

Mixture/Component	Month	Daily Liquid Surf. Temperatures (deg F)			Liquid Bulk Temp. (deg F)	Vapor Pressures (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Diesel #2	All	53.12	47.11	59.13	51.12	0.0052	0.0042	0.0063	130.000				
Distillate fuel oil no. 2						0.0052	0.0042	0.0063		1.0000	1.0000	130.00	Option 4: A=12.1010, B=8907.0

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
DETAIL CALCULATIONS (AP-42)

04/08/96
PAGE 3

Annual Emission Calculations

No Standing Losses: Underground Tank

Withdrawal Losses (lb): 0.0797

Vapor Molecular Weight (lb/lb-mole): 130.000000

Vapor Pressure at Daily Average Liquid

Surface Temperature (psia): 0.005150

Annual Net Throughput (gal/yr): 5000

Turnover Factor: 1.0000

Tank Diameter (ft): 10

Working Loss Product Factor: 1.00

Total Losses (lb): 0.08

TANKS PROGRAM 2.0
EMISSIONS REPORT - DETAIL FORMAT
INDIVIDUAL TANK EMISSION TOTALS

Annual Emissions Report

Liquid Contents	Losses (lbs.):		Total
	Standing	Withdrawal	
Diesel #2	0.00	0.08	0.08
Distillate fuel oil no. 2	0.00	0.08	0.08
Total:	0.00	0.08	0.08

APPENDIX B

"H. Z. L. Shapiro"

May 2, 1996

M E M O R A N D U M

TO: Robert Wilkosz, Chief, Technical Services Bureau (TSB),
Permits and Enforcement (P&E)

FROM: Mary Walsh, Air Quality Meteorologist, TSB, P&E *MW*

THRU: Avijit Ray, Environmental Sciences Manager, TSB, P&E *Ray*

SUBJECT: Review of Modeling/Impact Assessment for Saint Luke's
Regional Medical Center (Boise)

1. SUMMARY

On January 30, 1995, DEQ received an application from Saint Luke's Regional Medical Center (SLRMC) for a Tier II Operating Permit. This document was determined to be incomplete on February 27, 1995. Upon reviewing additional information from the facility, it was determined on January 10, 1996 that the application was still incomplete. On February 8, 1996, further information on the sterilizers and aerators operating at the plant was received by DEQ. On March 6, 1996, the application was determined to be complete. ✓

As part of the application process, an air dispersion modeling analysis of the impacts of four boilers and six generators, already in operation at the facility, was completed using the newest version of the ISC model. The effects of these existing sources upon the ambient concentrations of PM_{10} , CO, and NO_x were modeled.

Maximum predicted impacts for these criteria pollutants were found to be within the applicable state and federal limits for the proposed emission rates and operating scenarios, providing that operations are restricted when Air Stagnation Advisories are affecting the Boise area.

2. DISCUSSION

2.1 Project Description

The applicant operates a hospital on 190 East Bannock in Boise, Idaho. The site is located within the Northern Ada County PM_{10} and CO nonattainment area. Three criteria pollutants for ten point sources have been modeled to show compliance with the NAAQS. The impacts of natural gas versus No. 2 diesel fuel for the four boilers were modeled.

2.2 Applicable Air Quality Impact Limits

The area, in Northern Ada County, is considered attainment for NO_x . The NAAQS for NO_x is $100 \mu g/m^3$ for the annual average.

Since this facility is already in operation, the applicable impact limits for PM_{10} and CO are the NAAQS standards of $150 \mu\text{g}/\text{m}^3$ for the PM_{10} 24-hour average, $50 \mu\text{g}/\text{m}^3$ for the PM_{10} annual average, $40,000 \mu\text{g}/\text{m}^3$ for the 1-hour CO average, and $10,000 \mu\text{g}/\text{m}^3$ for the 8-hour CO average, respectively.

2.3 Background Concentrations

The background concentrations for the PM_{10} annual average has been set at $46 \mu\text{g}/\text{m}^3$. The background NO_x concentration was assumed to be $50 \mu\text{g}/\text{m}^3$, which has been recommended by the EPA as a very conservative value for the northwest. Since the background NO_x concentration used is a very conservative number, potential co-contributors were not included in the analysis.

2.4 Co-contributing Sources

Co-contributing sources were not considered in this analysis.

2.5 Modeling Impact Assessment

The newest version of the ISCST3 model was used with Boise 1985 surface and upper air meteorological data to assess the potential impact of ten point sources upon ambient concentrations of NO_x , PM_{10} , and CO. As part of a conservative preliminary analysis, air dispersion modeling to determine the combined impact of the six generators and the four boilers respectively was completed. The results of this conservative approach showed exceedances of the applicable standards for both PM_{10} and NO_x . The individual impacts from each boiler were then determined to allow for a more realistic analysis. The impact of natural gas versus No. 2 diesel fuel for the boilers was also studied. After factoring in the actual worst case operating limitations, the results were compared with the applicable NAAQS.

The modeling runs were initially set up to determine the ambient concentrations resulting from the continuous operation of each source. For each averaging period, short versus long term, the worst case operating scenario was determined and the appropriate operating limitations were factored into the results to give the most realistic analysis of the potential impacts of the existing sources.

For the short term averaging periods, the worst case scenario entailed the simultaneous operation of the six generators for 20 hours per day and two boilers for 24 hours per day. For

Table 1. The predicted pollutant concentrations for the six generators and natural gas boilers.

Pollutant	Predicted Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period	Allowable Concentration ($\mu\text{g}/\text{m}^3$)	Impact Limit (%)
*PM ₁₀	137.6	**24-hr	150.0	92
PM ₁₀	48.8	***Annual	50.0	98
NO _x	79.4	***Annual	100.0	79
*CO	1910.5	**1-hr	40000.0	5
*CO	791.7	**8-hr	10000.0	8

Table 2. The predicted pollutant concentrations for the six generators and No. 2 diesel fuel boilers.

Pollutant	Predicted Concentration ($\mu\text{g}/\text{m}^3$)	Averaging Period	Allowable Concentration ($\mu\text{g}/\text{m}^3$)	Impact Limit (%)
*PM ₁₀	139.1	**24-hr	150.0	93
PM ₁₀	49.0	***Annual	50.0	98
NO _x	80.6	***Annual	100.0	81
*CO	1922.9	**1-hr	40000.0	5
*CO	797.5	**8-hr	10000.0	8

NOTE:

* These values are part of the background concentration. The background concentrations are above the national standards due to Boise's nonattainment status for PM₁₀ and CO.

** The short term averages were determined assuming worst case operating conditions for six generators at 20 hours per day and two boilers at 24 hours per day.

*** The long term averages were determined assuming worst case operating conditions for six generators at 60 hours per year, each boiler operating for a consecutive three month period and the worst case boiler operating for a maximum of one month.